

REQUEST FOR RECONSIDERATION

Claims 11-16 remain active in this application.

The claimed invention is directed to an offshore pipe comprising a layer of a syntactic polyurethane comprising a polyol component which comprises a 5 to 60 wt.% of polyetherpolyol and 10 to 90 wt. % of an oil based on C₆₋₂₅ fatty acids and comprising hollow microspheres.

Offshore pipes, used to transport oil through the ocean depths, are benefited by thermal insulation properties which have heretofore been achieved by inclusion of a hollow microfillers. However, such microfillers can lead to a reduction in hydrolytic stability as well as unsatisfactory low-temperature flexibility. Accordingly, offshore pipes having good thermal insulation properties, hydrolytic stability and low temperature flexibility are sought.

The claimed invention addresses his problem by providing an offshore pipe comprising a layer of a syntactic polyurethane comprising a polyisocyanate component, a polyol component which comprises 5 to 60 wt. % of a polyetherpolyol and 10 to 90 wt. % of an oil based on C₆₋₂₅ fatty acids and hollow microspheres. Applicants have discovered that the presence of 10 to 90 wt. % of an oil based on C₆₋₂₅ fatty acids in the polyol component can improve stability to hydrolysis. Such an offshore pipe is nowhere disclose or suggested in the cited references.

The rejection of claims 11-16 under 35 U.S. C. 103(a) over Grimm et al. U.S. 6,387,447 in view of Croft U.S. 5,688,860 is respectfully traversed.

None of the cited references, alone or in combination suggest that the claimed polyol component containing 5 to 60 wt. % of a polyetherpolyol and 10 to 90 wt. % of an oil based on C₆₋₂₅ fatty acids would provide improved hydrolytic stability in an artificial seawater test.

Grimm et al. has been cited for a disclosure of a pipe comprising a syntactic polyurethane layer comprising a polyol having an OH number of 36 as well as castor oil,

citing example 1. Castor oil is present as a result of its use as a carrier for a zeolite component. There is no specific reason to incorporate castor oil into the polyurethane other than for the introduction of the zeolite. Accordingly, as noted in the official action there is no disclosure of the claimed content of 10-90 wt.% of oil based on fatty acid.

Croft has been cited for a disclosure in which castor oil is used as a polyol component in a polyurethane. There is no disclosure of the claimed combination of 5-60 wt. % of polyether polyol having hydroxyl number of 10-280 and 1090 wt. % of a C₆₋₂₅ fatty acid oil. Moreover, there is no suggestion in Croft that inclusion of an oil based on a C₆₋₂₅ fatty acid would provide enhanced hydrolytic stability.

Furthermore, the combined disclosures of Grimm et al. and Croft fail to suggest an enhancement in hydrolytic stability.

Grimm et al. merely includes castor oil as a vehicle for introduction of a moisture scavenging zeolite, a content of castor oil which has no effect on the water uptake of the polyurethane and therefore the hydrolytic behavior. Croft simply discloses a polyurethane polyurea elastomer for use as an encapsulant, a sealant, an end seal, a gasket and a dam for telecommunications and electric devices (column 1, lines 9-11 and column 18, lines 19-24). Croft fails to suggest use of the elastomer in a humid environment, such as in contact with sea water, especially for use as thermo insulation of sub sea pipelines like off shore pipelines. As the inventive goals of the two references are completely different there would have been no motivation to combine the disclosures of the two references.

Moreover applicants have tested the hydrolytic stability in an artificial seawater test of a syntactic polyurethane containing a polyol component containing 10-90 wt. % of an oil based on C₆₋₂₅ fatty acids and a polyetherpolyol having an OH number of from 10 to 280 as compared with a composition containing less than 10 wt. % of a C₆₋₂₅ fatty acid and a polyetherpolyol having an OH number of from 10 to 280. The polyurethane composition

were tested as cubes with a length edge of 25 mm produced by mixing components described in Table 1 as follows:

Components (parts by weight)	Example	Comparative Sample
Castor oil	58.75	2.5
Polyol 1 ¹	30	43.9
Polyol 2 ²	-	31.65
Dipropylene glycol	7.3	18
Additive	3.95	3.95
Hollow microspheres	42	42

¹Based on propyleneoxide with an OH-number of 104

²Based on propyleneoxide with an OH-number of 55

The additive contained a catalyst, defoamer and moisture scavenger added in 2.5 pbw of castor oil. The polyisocyanate component was Iso PMDI 92050, a diphenylmethanedisocyanate.

The cubes were stored in artificial seawater at a temperature of 80°C and the water uptake was measured at time intervals of 7 days, 14, days and 28 days. The data is as follows:

Water content after days (wt.%)	example	Comp example
0	0	0
7	2.0	3.6
14	2.3	3.8
28	2.0	3.7

The data demonstrates an increases uptake in water, indicative of hydrolysis of the syntactic polyurethane for the comparative sample containing only 2.5 pbw of castor oil as compared with the example containing 58.75 pbw of castor oil. Such an improvement in hydrolytic stability from the addition of a fatty acid oil to the polyol component is not suggested by the cited references.

Comparison Using Same Castor Oil Content As Reference

Page 4 of the outstanding official action asserts that a polyol concentration of 2.5 pbw is not commensurate in scope with the closest prior art. Applicants note that the concentration as a percentage of polyol is much greater than only 2.5 pbw. 2.5 pbw, based on the total weight of the polyol component b) is the concentration of the oil based on fatty acids b2, as claimed. Grimm et al. discloses in example 1 the production of a syntactic polyurethane using 2 pbw of zeolite in 50 wt. % castor oil in component A, 3 pbw of zeolite in 50 % castor oil in component B and 100 pbw of a polyether as polyol component. Therefore, Grimm et al. discloses the use of only about 2.5 pbw of castor oil **based on the total** amount of isocyanate reactive component. This is exactly the amount used in the comparative example of the Huntemann declaration. Here also 5 pbw of a moisture scavenger (a zeolite) was applied in 50% castor oil which corresponds to 2.5 pbw castor oil. Thus, the comparative example is a comparison using the same content of castor oil as the cited reference. The scope of applicants' comparison compares quite well with the examples in the reference.

Comparison Making As Few Changes As Possible

Furthermore, while the office action is critical of the use of different amounts and types of polyol and dipropylene glycol, applicants note that the comparison reduces the castor oil content from 58.75 to only 2.5 %, based on the amount of isocyanate reactive compound. Since the chemical behavior of castor oil is completely different to the behavior of polypropylene oxide, it was **not possible** to obtain a syntactic polyurethane with suitable mechanical properties by simply replacing castor oil with one of the other components of the isocyanate reactive components (polyol 1 or chain extender). Therefore as little change as possible was made. Most of the castor oil which was replaced was substituted with **the same chain extender and polyol** as used in the example. The only additional component was

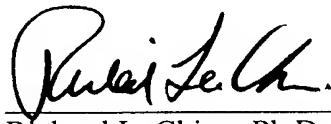
polyol 2, but it must be recognized that polyol 2 is the same polyol composition as polyol 1 and only had a slightly lower OH-number. All other components used as catalyst, isocyanate, hollow microspheres and additives were maintained to be the same. Thus, in spite of the immediately observed differences, the differences between the inventive and comparative samples is quite small and necessary to achieve sufficient mechanical properties for the application.

As the cited references fail to suggest an improvement in hydrolytic stability by the addition of a fatty acid oil to the polyol component, the claimed invention is not rendered obvious by the cited references and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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